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Governance Quality, Public Expenditure Efficiency, and Economic Growth

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In this paper, we first examine the impact of governance quality on public expenditure efficiency. Then, we try to determine the effect of these expenditures on economic growth. Our starting point is the idea that public expenditure efficiency of a government program is significantly affected by the country's governance quality. In other words, changes in government expenditure and the returns they generate on a government program depend on governance quality. Our sample consists of 36 countries observed over the 1996 to 2020 period. This period is known by a significant transition of political regimes. Our research model links government expenditure with the returns generated in a country in a given sector. In this model, we introduce the governance variable to examine the impact of government expenditure on returns on a government program in terms of schooling rates and life expectancy. The results indicate that governance quality affects expenditure structure and that efficiency of this expenditure positively correlates with a better governance quality as measured by corruption control and government efficiency. We also found that efficient expenditure has a positive impact on economic growth.

Keywords: governance quality, public expenditure returns, efficiency, economic growth, dynamic GMM, DEA

Introduction

In recent years, governments in developing countries have initiated a major reform of their public administrations the aim of which is to modernize and improve governance of public management. This reform came under a national and an international framework marked in particular by three important components. The first relates to governmental commitment to a process of democratization of society and of transparency in managing public affairs. Thus, opening up these national economies and integrating them into the global market needs necessarily improving competitiveness of domestic firms and setting up a legal and an institutional business environment. The second highlights the continued efforts to boost economic growth. Given the growing need for jobs and for accessing basic social infrastructure, developing countries need to design a growth model that is more appropriate to their economic, institutional, and social characteristics. The third calls for launching several sectorial reforms requiring substantial funding. Williamson (2015) indicates that such funding should cover the fight against poverty, extension of social coverage, reform of education and

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training (in particular generalizing education to all social categories), housing reforms, expanding rural access to basic water, electricity, and rural roads.

Although there is controversy over the concept of governance, and although it is used differently by different schools of thought, it is possible to point to the common dimensions which the different approaches refer to when using this term (Beunen, Duineveld, & van Assche, 2016).

Generally, governance found its foundation in an increasing dysfunctioning of public actions, which would impose introducing new principles and new forms for public management (Pinson, 2015). These involve bringing together actors of all sectors, members of civil society, professionals, citizens, and trade unionists, into managing public affairs through processes of participation and negotiation, which should lead to objectives and projects (Birkland, 2015). However, it is legitimate to ask what purposes the notion of governance is used for. It is in this context that our study positions itself. Our paper then is structured as follows:

First, we present a review of the literature on the impact of public expenditure on economic growth. Then, we present our methodology and research model. Finally, we conclude by presenting the results and their discussion.

Literature Review

Recent (endogenous) growth models assume that governments, through public investment, exert a direct impact on the private sector efficiency, contributing thus to improving private productivity. In this regard, Barro (1990) develops a growth model where public expenditure plays a leading role in the growth process.

The role of public expenditure in recent endogenous growth models is reconsidered in particular with the work of Barro (1990). The latter, assuming the existence of a single sector in the economy and constant returns of scale, develops a model where public expenditure plays an essential role in increasing GDP.

Other studies, particularly those of Aschauer (1989) on the US context, have succeeded in confirming the existence of a positive correlation between public expenditure and growth through the mechanism of externality of public expenditure leading to increasing returns of scale in the production function of private agents.

In 1996, Rajhi developed a model that introduced public expenditure as an input to the production function, but he abandoned the two main assumptions proposed by Barro (1990): the existence of a single sector of production and the constant returns of scale. Moreover, the considered public expenditure is supposed to increase productivity both in the consumer goods sector and in the education sector and is financed on a flat-rate basis.

From a theoretical point of view, this model integrates public expenditure in an endogenous growth framework with increasing returns of scale. It shows that an increase in productivity can be achieved by a government that levies taxes on private agents and on infrastructure and education expenditure programs, which are the real support for technology mastery and diffusion.

Two recent studies found that, regardless of gains in efficiency, public allocations remain insufficient in many cases. The first study of Gupta, Verhoeven, and Tiongson (2001) found that a decrease of about two-thirds in infant mortality rate in countries eligible under the Heavily Indebted Poor Countries Initiative would need a level of public health expenditure around 12% of GDP, whereas in reality it is about 2%. The other findings of this study indicate that a significant increase would not be sufficient if no significant progress is made in other areas affecting infant mortality rates, such as increasing schooling rates among women. However, a major effort on public expenditure will be required anyway.

The second study is the “Macroeconomics and Health” report of the World Health Organization (2002). The authors start from an estimate of the resources needed to significantly increase the coverage rates of a set

of “essential” health interventions for some diseases (tuberculosis, HIV, BCG/DPT/OPV vaccinations, measles, maternal care, etc.) in developing countries by 2007 and then 2015.

Khan and Kumar (1997) examined a sample of 95 developing countries over the 1970-1990 period to show that the effects of private and public investment on growth were significantly different in that private investment is found to be more productive than public investment.

Easterly and Rebelo (1993) showed that public investment in transport and communications positively relates to growth. However, Devarajan, Swaroop, and Zou (1996) gathered empirical evidence for an inverse relationship between public investment and growth. Specifically, the authors found that public investment in agriculture had a negative effect on growth, arguing that governments may have made poor allocations of resources (by favoring capital expenditure at the expense of basic infrastructure).

In 1998, Rodrik (1998) studied long-term growth in sub-Sahara Africa during the 1965-1990 period and found that it was significantly affected by fiscal policy (in addition to human resources, demography, and an exogenous variable). Small central administration surpluses tended to slow down GDP growth per capita in the region. Similarly, Stenberg et al. (2014) also found that an increase in public expenditure reduces GDP per capital growth.

Considering the budget deficit to consumer expenditure ratio, Ghura and Hadjimichael (1996) found a negative and a significant relationship with GDP growth per capita.

Morley and Perdikis (2000) who used an error correction model to examine Egyptian data found that total government expenditure has a positive effect on long-term growth and particularly after the 1974 and 1991 tax reforms. Nevertheless, no significant effect could be detected in the short term.

Lack of robust empirical work on the relationship between public expenditure and growth can be explained in part by the nonlinear nature of the relationship between these variables. In the Barro model (1990), growth increases with taxes and expenditure at low levels and then falls as distortionary effects outweigh the beneficial effects of public assets. Public expenditure and growth are positively related when public expenditure is below their optimal amount, and are negatively related when it is above that level. Some cross-sectional studies have generally failed to explain this nonlinearity, and even they were unable to detect it in the data.

In spite of the inconclusive nature of the empirical literature on the subject, there seems to be a consensus that changes in public expenditure structure in favor of basic health, education, and infrastructure tend to have a positive impact on growth. However, it is essential to insist on governance quality and institutional environment as frameworks that ensure the efficiency of public expenditure in terms of returns.

Methodology

Our methodology follows a three-step approach. First, we present the econometric method used in this paper. Then, we present the econometric model. Next, we present the sample of the study and the variables used in our econometric estimation. Finally, we present the results and interpret them.

Econometric Method

We use the Dynamic Panel Generalized Moments Method to control individual and temporal specific effects, and overcome endogeneity problems of the variables.

In view of the advantage of the dynamic method compared to standard methods, we use the GMM in system method to estimate our empirical model.

Data and Sample

Our sample consists of 37 countries that have experienced a transition in their political regime. Thus, we consider Latin American, Asian, European, and African countries. We use annual data from 1980 to 2014 to study the impact of public expenditure in the health and education sectors on national health measured by life expectancy of 65 years, on the one hand, and on secondary education schooling rate, on the other hand. The statistics are taken from the World Development Indicators database. We also use data on governance quality of a country, measured by corruption level (using a score of 1 to 6). This index reflects corruption in the political system and government efficiency. These latter reflect public service quality, bureaucracy, competence of state officials, independence of administration from political pressure, and credibility and transparency of government's reforms, commitments, and policies.

We also use other variables like GDP growth that reflects the economy's real activity, and income inequality that reflects human development levels (generally measured by the Gini index).

The Model

In order to determine the impact of good governance on the relationship between public expenditure and its returns, we start from the assumption that public expenditure efficiency for a government program is clearly affected by governance quality in a country. In other words, changes in government expenditure and the returns they generate on a government program depend on governance quality. In this regard, it is important to study the process by which the distribution of public expenditure is achieved. To this end, we consider the hypothesis that public governance quality affects the allocation of public expenditure. Thus, good governance is a crucial element in the optimal allocation of different types of public funding. Good governance practices depend themselves on the budget allocated to the various public sectors. Nevertheless, in general these expenditures are allocated to areas that favor the benefits of interest groups at the expense of others, thus giving way to a profit-seeking behavior. Indeed, corruption-sensitive government officials may anticipate bribes paid by companies and also find opportunities to favor some sectors during budget preparation.

From an economic point of view, corruption can influence the allocation of expenditure on operational and maintenance activities (Tanzi & Davoodi, 1997; Collier & Hoeffler, 2005), increase the share of military expenditure in GDP (Gupta et al., 2000), and reduce the share of education and health expenditure in GDP (Mauro & Driscoll, 1997; Gupta & & Abed, 2002).

Accordingly, we follow Filmer and Pritchett (1999) who assume that the return of a public program (p) in country (i) is obtained by the following production model:

$$R_i^p = e^{A_i}.\left[\frac{PIB_i}{N_i}\right]^{\alpha}\left[\frac{DepPub_i^p}{PIB_i}\right]^{\beta} \quad (1)$$

$$\alpha > 0 \text{ and } \beta \geq 0$$

R_i^p: returns of program (p) in country i

$DepPub_i^p$: public expenditure on program (p) of country i

N_i : population of country i

A_i: specific factors of country i

The choice of the production model of Equation (1) indicates that the returns of a public program:

a. Is justified with an increase in the country's income;

b. Is justified if an increasing share of the country's resources is spent on this program;

c. Depends on country-specific factors.

Returns of a given program should, therefore, reflect for example an improvement in health rates or schooling rates.

Analytically, Equation (1) can be rewritten in the following linear form:

$$Log\left(R_i^p\right) = A_i + \alpha Log\left[\frac{PIB_i}{N_i}\right] + \ \beta Log\left[\frac{DepPub_i^p}{PIB_i}\right] \quad (2)$$

To estimate this Equation (2), researchers often use the official public budget documents of the countries in question. However, in most cases a share of public resources earmarked for a given program is spent on the program. Therefore, we assume that only a share $\gamma(.)$ is used to finance a given program.

Following Pritchett (1996), we assume a coefficient (β) representing public expenditure on a program *P* that can be written as follows:

$$\beta = \ \gamma(.) * \beta_p \quad (3)$$

where:

β_p represents productivity of public capital created by an expenditure on a program *P*.

We assume also that $\gamma(.)$ measures public expenditure efficiency, which is a function of governance quality G_i in each country i. Thus, $\gamma(.)$ can be written as follows:

$$\gamma_{i=}\ \emptyset_{0i} + \emptyset_{1i}\ .G_i \quad (4)$$

G_i denotes the governance quality represented by the global governance index calculated using the PCA method using the six governance indices calculated by D. Kaufman.

Next and in order to obtain the general linear form to be estimated, we replace Equation (4) in Equation (3), and by replacing the expression found in Equation (2), we obtain:

$$Log\left(R_i^p\right) = \ A_i + \alpha Log\left[\frac{PIB_i}{N_i}\right] + \ \beta_p(\emptyset_{0i} + \emptyset_{1i}G_i)Log\left[\frac{DepPub_i^p}{PIB_i}\right] \quad (5)$$

Our aim is to test the interaction between public expenditure variables for each sector studied and governance variables (corruption and government efficiency) in order to examine the impact of good governance on improving expenditure returns on programs. In practice, it amounts to making a change of variables in order to construct the regression model, which will estimate our panel data.

In the case of a government health program (represented by the variable HS), the regression that we test is as follows:

$$Log(Espvie_i) = \ \delta_0 + \delta_1 Log(PIB) + \delta_2 Log(Depsante) + \delta_3 G_i + \delta_4 G_i Log(depsante) + BX_i + \varepsilon_i \quad (6)$$

where:

Espvie: health status

PIB: GDP per capita

$Depsante$[1]: share of public health expenditure in GDP

G: two measures of governance quality (corruption, government efficiency)

X: health-unrelated country-specific factors

B: vector of coefficients of X

[1] The variable PSPIB is determined by dividing total health expenses (sum of public and private health expenses that cover provision of health services, family planning activities, nutrition activities, and health-based emergency help, but do not include water and sanitation expenses) by GDP per capita in each country.

ε_i: error term

In order to determine the effect of good governance on health, the variable G_i is introduced as an independent term in Equation (6).

Results

As a first step, we present the results of the impact of governance quality variables on the returns on public expenditure on a government program. In a second step, we present the results of the impact of public expenditure efficiency on economic growth.

Impact of Governance Quality on Public Expenditure Returns

Effect of public expenditure on health rates. The first part of Table 1 presents the results of the dynamic GMM estimation of factors affecting public health expenditure. Then, we construct two regression models without considering the impact of the interaction between the governance index and health expenditure. We also test the impact of corruption and government efficiency on the returns of a government program that is financed by public expenditure. The second part of the same table presents the econometric results by introducing the interaction term between the governance index (corruption and government efficiency) and the variable representing health expenditure.

Table 1

Impact of Public Expenditure on the State of Health

	No interaction effect				Interaction effect			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Coefficients	ρ value	Coefficients	ρ value	Coefficients	ρ value	Coefficients	ρ value
Espvie (-1)	0.994 (256.85)	0.000***	0.997 (361.99)	0.000***	0.994 (322.34)	0.000***	0.676 (101.10)	0.000***
Government	0.157 (2.67)	0.011***			0.163 (2.03)	0.05**		
Corruption			0.097 (1.78)	0.083*			0.829 (3.99)	0.000***
intg					-0.012 (-1.89)	0.067*		
intc							0.116 (6.73)	0.000***
lpib	0.064 (2.34)	0.025**	0.025 (1.16)	0.253	0.048 (2.62)	0.013**	-0.350 (-4.41)	0.000***
Depsante	1.25^{e}-8 (3.86)	0.000***	1.03^{e}-8 (2.90)	0.006***	1.14^{e}-08 (4.17)	0.000***	1.17^{e}-07 (7.07)	0.000***
Ingrevenue	-0.002 (-2.53)	0.016**	0.001 (-1.71)	0.096*	-0.002 (-2.50)	0.017**	0.734 (13.14)	0.000***
Constant	0.818 (2.76)	0.009***	0.629 (2.96)	0.005***	0.831 (3.49)	0.001***	2.951 (5.50)	0.000***
	F-stat = 30,962 (Prb = 0.000)		*F*-stat = 35.032 (Prb = 0.000)		*F*-stat = 53,507.75 (Prb = 0.000)		*F*-stat = 106.75 (Prb = 0.000)	
AR (1)	-1.16 (*p*-value = 0.248)		-0.50 (*p*-value = 0.615)		-1.03 (*p*-value = 0.302)		-3.33 (*p*-value = 0.001)	
AR (2)	0.27 (*p*-value = 0.786)		1.63 (*p*-value = 0.103)		0.34 (*p*-value = 0.731)		-1.93 (*p*-value = 0.054)	
Hensen test	11.38 (*p*-value = 0.329)		12.16 (*p*-value = 0.274)		26.14 (*p*-value = 0.618)		28.76 (*p*-value = 0.582)	
Number of instruments	16		16		20		36	
Number of observations	464		464		464		478	

Notes. *, **, and ***: significant respectively at 1%, 5%, and 10%.

Results Without the Interaction Effect

Statistically, the econometric results are satisfactory and show that the two regression models are globally significant. The F-statistics of the global significance tests as well as their probabilities reject the null hypothesis of the model's coefficients. This result allows us to point to the significant impact of the independent variables, public health expenditure, governance variables (corruption control and government efficiency), and the macroeconomic control variables (*lpib* and *ingrevenue*) on the returns of a public health program measured in our case by life expectancy rates.

We also found that the AR (1) and AR (2) tests do not indicate first and second order autocorrelation problems. In addition, the Hensen instrument validity test points to the good choice of these instruments with no over-identification problem.

The analysis of the individual significance of the model's independent variables allows us to deduce the following:

The *lpib* and *ingrevenue* variables respectively representing economic growth and human development (income inequality) are statistically significant with a positive sign for economic growth and a negative sign for human development. This result indicates that a considerable portion of economic growth contributes to the improvement of citizens' health, which is manifested in a positive effect on life expectancy rates. On the other hand, the *ingrevenue* variable has a negative and a significant coefficient which indicates a negative impact of income inequalities on health. Thus, a lower level of inequality directly relates with an increase in life expectancy, and consequently an improvement in life quality. In this regard, Marmot and Wilkinson (2001) revived the debate on the link between income inequality and health by highlighting a correlation of -0.81 between life expectancy of 11 industrialized countries and the Gini income index. He hypothesized that inequalities reflected in the Gini income index were an essential determinant of health status. Similarly, Jusot (2006) investigated the relationship between mortality and income inequality in France. The author's results show that risk of death strongly correlates with income level. This relationship is true throughout the income distribution process, irrespective of the effect of socio-professional categories. In addition, Preston (1975), conducting international comparisons, concluded that life expectancy did not increase with per capita income, while average wealth in developing countries largely explains populations' average health status. This relationship is not valid in rich countries.

Health expenditure (*depsante*) also has a coefficient that is statistically significant and different from zero. This result shows that public expenditure, especially on health services, accounts for a very large share of total government expenditure. Generally, these care services are considered a public service. The impact of public expenditure on health is higher in low-income countries than in other countries, in particular in a good governance institutional environment. This result corroborates that found by Gupta, Verhoeven, and Tiongson (2001), who show that the impact of public expenditure on health is higher for the poor than for the non-poor. Filmer, Hammer, and Pritchett (2000) and Gupta, Verhoeven, and Tiongson (2001) found evidence indicating that

> the marginal benefit of public expenditure on health is higher for the poor regardless of the health received by the different income groups. This means that even with a uniform distribution of public health expenditure for different income groups, the impact of public expenditure on health will be even more important for the poor.

Generally, people attach importance to their good health. As a result, rising life expectancy is associated with rising care costs, and management of these costs is currently seen as one of the most important challenges facing governments.

Regarding the effect of governance on the returns of a government health program, the "government" variable has a statistically significant coefficient with a positive sign indicating that it has a positive impact on health. *t*-student is 2.67 (Equation (1)) with zero probability. This result shows that a 1% increase in the index reflecting government efficiency leads to a 15.7% improvement in health, i.e. an increase in life expectancy. From an economic point of view, healthcare expenditure under a given government program contributes to improving delivered health care services and allows citizens access to these services without discrimination. On the technical side, healthcare expenditure provides those in the field with highly technical resources and a more favorable working environment in order to provide a better service quality and allow for meeting new needs. From a political point of view, this result reflects independence of the health care administration from political pressures on their commitment and the quality of policy implementation.

Interaction Effect

The results indicate that the interaction term with governance (*intg*, *intc*) in both equations is statistically significant with a positive interaction sign with the variable representing corruption control, and a negative sign with the variable government efficiency. The negative interaction sign with government efficiency is surprisingly unexpected. This finding is specific for the studied countries (transitional). During this transitional period, these countries are redesigning governance systems according to new principles to reduce social losses and favor the poor population. These efforts need more time and resources to be put in place. However, the positive sign of the variable (*intc*) that measures interaction with corruption is economically expected as corruption control makes expenditure allocation efficient and generates better outcomes in terms of program revenues.

The impact of the interaction term with health in these countries shows the importance of the governance system in allocating public resources that impact the efficiency of government health programs. Indeed, corruption favors non-productive projects, since it tends to mislead public expenditure authorities by directing them towards the acquisition of equipment, reducing thus public investments productivity, in particular by lowering infrastructure quality and increasing in the cost of goods and services. This would lead to a weakening of the quality of any government service and production. In a corrupt regime, individuals seek to find profits rather than productive activities by modifying the structure of public expenditure. Given these results, we saw it fit to assess the net effect of governance on health.

Net effect of governance quality on health expenditure efficiency. The net effect of public expenditure is calculated by estimating the elasticity of public expenditure according to different governance levels. Thus, this elasticity is assessed in terms of corruption and then in terms of government efficiency, using the following formula:

$$\frac{\%\Delta \text{life expectancy over 65 years}}{\%\ \Delta \text{public heallth expenditure}} = \ \alpha_2 + \alpha_4 * gov$$

with:

$gouv$: a vector of variables consisting of the variable corruption and the variable government efficiency (*corruption*, *government*).

Table 2

Net Effect of Governance Quality (Case of Health Expenditures)

Without interaction effect		
	Health status (life expectancy over 65 years)	
Impact on	Equation (1) (corruption effect)	Equation (2) (effect of government efficiency)
	0.56*	0.53
Interaction effect		
	Health status (life expectancy over 65 years)	
Impact on	Equation (1) (corruption effect)	Equation (2) (effect of government efficiency)
	0.36*	0.31

Note. *: significant at 1%, level.

When this elasticity is assessed in terms of corruption, it is 56% against 53% when assessed in terms of government efficiency. The signs are positive indicating an improvement in health resulting from an investment in a public health program. Thus, a better governance practice, because of a low corruption level and public policy efficiency, achieves considerable results for a given program. Similarly, governance based on improved public and private service quality, independence from political pressures, policy formulation and implementation quality, and government accountability for such policies, reduces the additional costs resulting from profit-seeking behavior and leads to the best results in terms of social welfare. However, this result can also be explained by the fact that additional public spending in this field can generate profit-seeking behavior, by channeling spending to programs that are less economically and technically efficient. Devarajan et al. (1996) interpret such a situation as a second tax and conclude that corruption has a negative effect when examining overall spending, which explains the low level of total expenditure, in particular, on health services against expenditure on acquisition of equipment which is excessively high, especially in developing countries.

Effect of public expenditure on education. In the case of education, we also test the impact of public expenditure on secondary education schooling rate. Thus, we consider the following regression:

$$Log(Tscolarsecod_i) = \delta_0 + \delta_1 Log(PIB) + \delta_2 Log(Depense) + \delta_3 G_i + \delta_4 G_i Log(depense) + BX_i + \varepsilon_i \quad (6)$$

with:

$Tscolarsecod$: secondary education schooling rate

PIB: GDP per capita

$Depense$: share of public spending on education to GDP

G: governance quality (corruption, government efficiency)

X: non-education country-specific factors

B: vector of the coefficients of X

ε_i: Error term

In this case, we tested also the impact of education expenditure with and without the interaction effect.

Table 3

Impact of Public Expenditure on School Rates

	Interaction effect				No interaction effect			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Coefficients	ρ-value	Coefficients	ρ-value	Coefficients	ρ-value	Coefficients	ρ-value
Tscolarsecod(-1)	0.988 (233.89)	0.000***	0.991 (250.95)	0.000***	0.986 (426.51)	0.000***	0.981 (623.91)	0.000***
Government	0.067 (2.23)	0.032**			0.098 (4.30)	0.000***		
Corruption			0.014 (0.44)	0.659			0.006 (6.05)	0.000***
Intg					0.007 (1.90)	0.065*		
Intc							8.954 (2.66)	0.012**
Lpib	0.036 (1.66)	0.106	0.017 (0.86)	0.394			-0.184 (-4.48)	0.000***
Depenseig	0.020 (2.70)	0.010**	0.021 (2.85)	0.007***	0.008 (3.66)	0.001***	0.006 (4.20)	0.000***
Ingrevenue	-0.001 (-2.06)	0.047**	-0.001 (-1.82)	0.077*	-0.001 (-4.01)	0.000***	0.004 (5.96)	0.000***
Constant	1.454 (4.23)	0.000***	1.21 (3.70)	0.001***			2.074 (16.30)	0.000***
	F-stat 16,516.90 (Prb = 0.000)		*F*-stat 16,419.60 (Prb = 0.000)		*F*-stat 41,881.57 (Prb = 0.000)		*F*-stat 470,224.49 (Prb = 0.000)	
AR (1)	-1.01 (*p*-value = 0.314)		-1.01 (*p*-value = 0.315)		-1.01(*p*-value = 0.315)		-1.11 (*p*-value = 0.266)	
AR (2)	0.99 (*p*-value = 0.322)		0.99 (*p*-value = 0.320)		0.99 (*p*-value = 0.321)		0.88 (*p*-value = 0.378)	
Hensen test	14.97 (*p*-value = 0.133)		14.85 (*p*-value = 0.138)		17.13 (*p*-value = 0.104)		26.98 (*p*-value = 0.465)	
Number of instruments	16		16		18		34	
Number of observations	440		440		440		846	

Notes. *, **, and ***: significant respectively at 1%, 5%, and 10% level.

Results Without Interaction Effect

The model estimated for education is globally significant and shows a better explanatory power of the relationship between the variables of public expenditure on education and governance on the returns of an investment education program. The Fischer tests of the different regressions allow for rejecting the null hypothesis of the model's coefficients.

Examining the AR (1) and AR (2) tests does not point to a first- and second-order autocorrelation problem. Similarly, the Hansen test reflects a better choice of instruments. This test proves that there is no over-identification of the instruments.

The findings show that the variable representing human development (*ingrevenue*) is statistically significant, with a negative sign indicating a negative impact of social inequalities on secondary education schooling rate.

The variable "*depenseig*" is also statistically significant and positive (for Equations (1) and (2)) indicating that an increase in schooling ratio positively correlates with expenditure on education. Consequently, an increase in expenditure by 1% leads to a 2% improvement (Equation (1)) in secondary education schooling rate. Similarly, an increase in these expenditures by 1% leads to a 2.1% improvement in schooling rate (Equation (2)). Indeed, education is one of the basic means to enable knowledge, power, and work in modern societies. For citizens, this is one of the essential means to actively participate in society. Education is above all an individual good; its profits can be studied in terms of consumption and investment. It represents also an

investment in human capital. This investment ensures skills that give people more chances to find a more interesting and better paid job. Education also generates external effects as it helps to socialize and inform people. The profits it provides to the company are relatively higher than the sum of the individual profits. This is why investment in education would not be sufficient for societal satisfaction and public activities are necessary since they can compensate for the unmet need.

The "government" variable (Equation (1)) reflecting governance quality is significant with a positive sign, confirming the important role of government efficiency in optimally allocating resources and in maximizing profits of government programs.

Similarly, for the "corruption" variable (Equation (2)), there is a statistically significant and a positive coefficient indicating the effect of corruption control on reducing the additional costs incurred by the government, leading to a reduction in services prices, and affecting thus social welfare.

Interaction Effect

Looking at the second part of Table 3, we notice that the interaction terms (intg, intc) are statistically significant with positive signs. These signs are economically expected for the two variables "intc" and "intg". This result indicates that good governance is an important element in strengthening the State's capacity to produce, implement good policies, and offer quality public services. It also indicates that the state's ability to manage resources efficiently and to implement quality policies and regulations is a key factor in explaining economic performance, particularly in terms of revenues. Consequently, an institutional framework with well-trained and uncorrupt civil servants and an impartial justice ensure the smooth functioning of the economy. Otherwise, an administration with overstaffing and scarce resources does not allow for an appropriate functioning of institutions.

In addition, the interaction between public expenditure on education and governance variables, that positively correlates with secondary education schooling rates, is statistically significant at all risk levels (1%, 5%, and 10%). This result is consistent with previous studies indicating that governance quality measured by corruption indices changes the structure of public expenditure. In particular, medium-governance countries, generally known by a high corruption level, produce less productive human capital.

Net effect of governance quality on education expenditure efficiency. In this case, we also assess the net effect of governance quality on schooling rate, which is calculated from the estimated elasticity of public expenditure. This elasticity is assessed as a function of different governance levels.

$$\frac{\%\Delta secondary\ \ education\ \ schooling\ \ rate}{\%\ \Delta \text{public education expenditure}} = \ \alpha_2 + \alpha_4 * gov$$

The results are presented in Table 4 below:

Table 4

Net Effect of Governance Quality (Case of Education Expenditures)

Without interaction effect		
	Schooling rate	
Impact on	Equation (1) (effect of government efficiency)	Equation (1) (corruption effect)
	0.30*	0.26
Interaction effect		
	Schooling rate	
Impact on	Equation (1) (effect of government efficiency)	Equation (1) (corruption effect)
	0.28	0.29*

Note. *: significant at 1%, level.

The results indicate that the effect of governance quality is relatively important for the countries of our sample, which are generally known by low macroeconomic stability. This effect indicates that when governance is assessed in terms of government efficiency, a 1% increase in this indicator (government) leads to a 0.30% improvement in secondary school enrollment rate. When governance is assessed in terms of corruption, an improvement of 1% in governance quality leads to an improvement of 0.26% in secondary education enrollment rate.

Impact of Public Expenditure Efficiency on Economic Growth

In this section, we explain the economic performance of a given country by the expenditure needed to produce efficient public services that can generate economic growth. Public expenditure efficiency has been examined by some authors (Bezes, Chiapello, & Desmarez, 2016) who have sought to construct an expenditure indicator in the areas of education, public health, basic infrastructure, and legal regulations. Public services quality plays a very crucial role in the process of economic growth, which justifies the concern with public services efficiency, in particular when determining their effects on growth.

We therefore use the notion of technical efficiency and start with presenting the efficiency measurement method in order to determine the impact of government expenditure quality on economic performance generally measured by economic growth.

Thus, technical efficiency is defined as the possibility of obtaining a maximum quantity by using a given input factor. Therefore, the difference between observed and maximum production using the input in question is a measure of efficiency. In this regard two approaches are considered. The input-oriented approach can be defined as the possibility, using a minimal amount of input, to produce a given quantity of output. The output-oriented approach denotes the possibility of producing the maximum quantity of output using a given input.

For the first approach, it is possible to determine the input quantity to be reduced without changing the output quantity in order to have an efficient production. As for the second approach, it is possible to calculate the output quantity that we should increase without changing the input quantity. Both approaches allow for estimating the technical efficiency of several inputs or outputs. They lead to the same result under the assumption of constant returns of scale because they identify the same efficient/inefficient producers or decision-making units (DMUs). Indeed, we can use the Data Envelopment Analysis (DEA) method in order to calculate these measures or also called efficiency scores. This is a nonparametric linear program which assumes that efficiency scores lie on a convex curve, called efficiency frontier. In order to calculate the efficiency scores for public expenditure on education and public health, we will use the “DEA” method, which is presented as follows:

Let an input quantity k and an output quantity m for n DMUs. For a decision-making unit (DMU) i, we consider y_i a vector of outputs and x_i a vector of inputs. Let X ($k \times n$) be the matrix of inputs and Y ($m \times n$) the matrix of outputs.

The purpose of the “DEA” method is to find a nonparametric boundary in a way that all observations lie below or on this curve. From a practical point of view, it is essential to introduce the ratios outputs/inputs into the specification. In other words, for each decision-making unit (DMU), one obtains a measurement of all the inputs with respect to the outputs such that $u'yi/v'x$i; with u is ($m \times 1$) a vector of output weights and v is ($k \times 1$) a vector of input weights.

In order to determine the optimal weights, we specify the following mathematical optimization program:

$$Maximize_{u,v}\left(\frac{uy_i}{v'x_i}\right)$$

$$S/C\ \frac{uy_i}{v'x_i} \leq 1, j = 1 \ldots . N$$

$$u.v \geq 0 \qquad (1)$$

where *u* and *v* are scalars related to each (DMU) such that efficiency is at its maximum and cannot exceed unity. However, the resolution of this type of linear program may give a multi-sided solution (example if (u^*, v^*) is a solution, then (αu^*, αv^*) is also a solution. Thus, in order to overcome this problem, an additional constraint is essential. Then, the program can be rewritten in this way:

$$Maximize_{u,v}(uy_i)$$

$$S/C v'x_i = 1$$

$$u.y_{i-}v'x_i \leq 0, j = 1 \ldots . . N$$

$$u.v \geq 0 \qquad (2)$$

The duality of linear programming allows us to derive an "enveloped" form of this problem for the variables of returns of scale:

$$Maximiser_{\theta,\lambda}(\theta)$$

$$S/C \quad -y_i + Y\lambda \geq 0$$

$$\theta x_i - X\lambda \geq 0$$

$$n1\lambda = 1$$

$$\lambda \geq 0 \qquad (3)$$

where: θ is a scalar and λ is a (n×1) vector of constants. The condition $n1'\lambda$=1 implies the convexity of the efficiency curve.

This program, which involves fewer constraints than the previous form ($k+m<n+1$), is generally preferred to the multi-sided solution problem.

The obtained value of the parameter θ represents the efficiency score for one (DMU) *i*. This value should satisfy the condition: $\theta \leq 1$. Si $\theta = 1$, then we are on the efficiency frontier and the DMU is technically efficient. Then, (1- θ) is the input quantity that should be reduced without changing the output making it possible to obtain an efficient production. Therefore, this linear programming should be solved *n* times (because we have *n* DMUs) to obtain a value of θ (efficiency score) for each DMU. Overall, it is a nonparametric method which consists in calculating an efficiency boundary using the input/output ratios.

For our case, we assume that the inputs considered are financial variables and not quantitative variables. This hypothesis allows us to conclude that the countries that spend most in the fields of education and public health perform better.

Calculating efficiency scores using the input-oriented approach allows us to determine the input quantity to be reduced without changing the output quantity. In other words, how much decrease in public expenditure on education and heal this needed, while maintaining the same profitability level of this expenditure?

Efficiency scores. In each sector, we use input and output variables which are used to calculate technical efficiency scores.

For education, these variables are:

- Inputs: Public expenditure on education as a percentage of GDP over the 1980-2014 period.

- Outputs: Secondary education enrollment rate, for the 1980-2014period.

For public health, the efficiency score is calculated by:

- Inputs: public expenditure on public health over the 1980-2014period.
- Outputs: life expectancy at 65 years and infant mortality rate less than 5 years.

In practice, we use the following approach to assess the impact of public expenditure efficiency on economic growth. First, we compute efficiency scores for the countries. Then, we determine the impact of governance quality on public expenditure efficiency in health and education. Finally, we test the impact of governance quality and efficiency scores on economic growth. To this end, we will consider two specifications inspired by the Barro model (1991). In the first specification, the impact of governance variables on public expenditure efficiency in education and health is compared. In a second specification, governance variables and efficiency scores were weighted to GDP growth per capita as a measure of economic performance. The regressions to be tested are as follows:

Specification 1: Efficiency Scores of Public Education and Health Services are a function of the governance index and the macroeconomic variables.

$$Scores_{it} = \alpha_0 + \beta_1 * gouvindex_{it} + \beta_2 * X_{it} + \varepsilon_{it}$$

Specification 2: GDP growth is a function of the efficiency scores of public education and health, the macroeconomic variables and the governance variables.

$$TCR_{it} = \alpha_0 + \beta_1 * scores_{it} + \beta_2 * X_{ij} + \beta_3 * G_{it} + \varepsilon_{ij}$$

With:

$Scoresi$ indicates technical efficiency scores for country *i* at year *t*. In our case, the education score (*score educ*$_{it}$) and the health score (*scores ante*$_{it}$).

$gouvindex_{it}$ denotes the governance index;

X_{it} represents the vector of macroeconomic variables (*ing revenue*, *lpib*);

G_{it} is the vector of governance variables (*voice*, *stability*, *law*, *regulatory*, *democracy*, *corruption*, and *government*);

TCR_{it} is GDP growth rate per capita.

The aim is to test whether expenditure on public education and health services contributes to improving economic growth. First, we present the results of the first specification, which deals with the impact of governance on public expenditure efficiency in terms of efficiency scores. Second, we present the results of the second specification which deals with the impact of efficiency scores and governance on economic growth.

Impact of governance on public expenditure efficiency. In the following, we examine the impact of governance quality on public expenditure efficiency measured by efficiency scores of education and health of each country. The two regressions to be tested are the following:

Public health:

$$SCORESANTE_{it} = \alpha_0 + \beta_1 * gouvindex_{it} + \beta_2 * lpib_{it} + \beta_3 * ingrevenue_{it} + \varepsilon_{it}$$

Education:

$$SCOREDUC_{it} = \alpha_0 + \beta_1 * gouvindex_{it} + \beta_2 * lpib_{it} + \beta_3 * ingrevenue_{it} + \varepsilon_{it}$$

To test the impact on efficiency scores, we use the generalized least squares method on panel data using the E-Views software, version 6.0 for Windows. The results are shown in Table 5 below:

Table 5

Impact of Governance Quality on Public Expenditure Efficiency

	Public education sector Dependent variable: scoreeduc			Public health sector Dependent variable: scoresante		
	Coefficient	*T*-stat	*p*-value	Coefficient	*T*-stat	*p*-value
Constante	0.206	5.372	0.000***	3.527	32.38	0.000***
lpib	-0.018	-0.702	0.482	-0.188	-2.262	0.024**
Inflation	6.57E-05	1.587	0.112	-0.004	-2.674	0.007***
Ingrevenue	-0.001	-1.475	0.140	-0.001	-0.647	0.517
Gouvindex	0.024	2.468	0.013**	-0.124	-4.551	0.000***
R^2	15.62%			29.94%		
F-stat	42.44 (prob = 0.000)			62.20 (prob = 0.000)		
No. of observations	922			587		

Notes. *, **, and ***: significant respectively at 1%, 5%, and 10%.

Examining Table 5, we can draw the following conclusions:

For the education sector, the estimated model is globally significant (*F*-stat = 42.44 and prob = 0.000) indicating that the governance index "*gouvindex*" and the macroeconomic variables account for 15.62% of the variance of efficiency across countries. However, only the variable "*gouvindex*" is statistically significant at a 5% level, suggesting the importance of governance quality in the efficient use of public resources. The sign of the variable "governance" is positive, indicating that a higher governance quality is associated with a higher efficient public expenditure on education. For the present case, a 1% improvement in governance quality leads to a 2.4% increase in the efficiency score. From an economic point of view, this result means that good governance reflects better public affairs management that will affect government expenditure efficiency by reducing unnecessary costs. Consequently, success of government programs necessarily depends on public management efficiency and not on an increase of expenditure on a given sector.

As for the health sector, the estimated model is globally significant with a better linear fit quality. The model's variables account for nearly 30% of the variance of the efficiency scores. The variable "*gouvindex*" is statistically significant, but having a sign that is economically unexpected. This negative sign can be explained by poor governance quality resulting from a poor public health management, particularly in countries in transition. Economically, increasing health care expenditure is next to a waste of resources. This can also be explained by the high cost of maintaining and controlling the use of medical equipments as a result of poor management. These findings indicate that corruption may justify the volume of public education expenditure. In this regard, it was Devarajan et al. (1996) who developed the notions of productive and unproductive public expenditure. Similarly, Guetat (2006) reported that the indirect impact of corruption on the long-term economic growth of the MENA region is mediated by investment and human capital. The implication of all this research is that corruption weakens the main factors from which long-term growth results. Thus, corruption has a negative effect on growth at different levels. It can divert the scarce resources of private investors, discourage public expenditure on education, health, and investment in human capital, make governments less efficient, and increase political instability. Corruption directly and indirectly increases poverty and income inequality (Gupta et al., 2001).

In all, we highlighted the importance of good governance practices on government expenditure efficiency, in particular the effect of corruption. Indeed, corruption prevails everywhere in public services and people's

access to essential services remains very limited and sometimes depends on bribing. This is mainly true for public provisions, leading either to a misappropriation of funds or to a change in the amounts allocated to education and healthcare services.

Impact of public expenditure efficiency on economic growth. In what follows, we study the impact of public expenditure efficiency on economic performance. We show that when government expenditure is efficiently allocated, it therefore leads to economic growth. To this end, we estimate the following regression using the ordinary least square method on panel data.

$$TCR_{it} = \alpha_0 + \beta_1 * scores_{it} + \beta_2 * X_{ij} + \beta_3 * G_{it} + \varepsilon_{ij}$$

The results of estimating this equation is shown in Table 6 below:

Table 6

Impact of Public Expenditure Efficiency on Economic Growth

Public education sector Dependent variable: economic growth (TCR)			
	Coefficient	*T*-stat	Probability
Constante	-9.106	-3.415	0.000***
Scoreeduc	2.489	1.782	0.075*
Scoresante	1.167	1.651	0.099*
Ingrevenue	-0.055	-5.137	0.000***
Inflation	0.024	1.2794	0.201
Voice	-3.981	-3.237	0.001***
Stability	0.945	1.833	0.067*
Law	1.519	1.404	0.160
Regulatory	2.063	2.675	0.007***
Democretie	0.608	1.456	0.145
Corruption	-2.305	-2.622	0.009***
Gouvernement	1.134	1.072	0.284
R^2	19.68%		
F-stat	9.71 (prob = 0.000)		
No. of observations	488		

Notes: *, **, and ***: significant respectively at 1%, 5%, and 10%.

The conducted statistical tests indicate that the variables introduced in the model contribute to explaining growth of the countries in transition. Indeed, the *F*-statistic is significantly higher than the tabulated value with a zero probability (*F*-stat = 9.71, prob = 0.000), which confirms the overall significance of the estimated model.

The variables representing the efficiency scores of education and public health (*Scoreeduc* and *Scoresante*) are statistically significant with positive signs. Such a finding points to a positive impact on economic growth. This also means that efficiency of public resources leads to an improvement in public services quality and increases the return on government expenditure while reducing the costs of projects in education and health.

This result is in line with that of Coulibaly (2013) who estimated an aggregate Cobb-Douglas-type production function model and found that public education expenditure has a positive impact on economic growth in Ivory Coast.

Similarly, Devarajan et al. (1996), using data on 43 countries and the ordinary least squares method, conclude that public expenditure has a positive and a significant effect on economic growth. However, the relationship between public expenditure components and capital growth is negative. Therefore, for these

authors, productive expenditure when used in excess may be unproductive. These results confirm the hypothesis of misallocation of public expenditure in favor of capital expenditure. On the other hand, our results are inconsistent with those of Suliman and Elian (2014), who found that in Jordan, capital expenditure and education do not lead to economic growth because education costs are higher. On the other hand, health and business expenditure have a significant impact on economic growth.

As for the governance variables, the variable "voice" is significant and statistically different from zero, but with a negative sign. This shows that citizens do not participate in choosing their government because of violation of their civil liberties and human and political rights.

The variable "stability" is significant at a 10% level. This variable has a positive effect on economic growth, highlighting the impact of a stable political environment on economic activity.

The "*Regulatory*" variable indicates a positive impact on growth and reflects citizens' respect of the laws and rules of society, like the efficiency and impartiality of the judicial system and the enforcement of legal contracts.

The variable "*Corruption*" is also significant with a negative sign. This sign is economically expected and it reflects the negative effect of corruption on economic growth, thus indicating the use of public authority for personal interests and private profits.

Finally, the variable "*Ingrevenue*" is significant and has a negative effect on growth because of the income inequalities that prevail the economies of the countries in transition. These inequalities act directly on consumer expenditure, which affects the growth pace through a counter effect on investment.

These results indicate also that efficiency (particularly assessed by the input-oriented approach) and governance quality play an important role in reviving economic activity by reducing the spins created by public action in the economic sector.

Given these results, we can conclude that economic growth is necessary to fight poverty. In principle, it improves household income and also allows the State to increase its revenues which it may eventually allocate to basic social services and infrastructure that could benefit the poor. In this regard, good governance is an essential element in accelerating the pace of economic growth. Such findings are observed in several countries, which have been able to reduce poverty as a result of a sustained economic growth. Indeed, economic growth is an engine of job creation and therefore of wealth distribution, as it is a main source of financing governments' economic and social development efforts, through investment in education, health, and basic economic and social infrastructure.

Conclusion

This study concludes that economic growth is an engine for job creation and therefore for wage distribution. Alternatively, economic growth proved itself to be the State's financing tool of its economic and social development plans through investment in education, health, and economic and social infrastructure.

The obtained results show that the impact of the interactive term (reflecting the interaction between the governance variables and the variables used in our model) on health status proves the importance of the governance system in the allocation of public resources. This latter has an impact on the effectiveness of government programs in the health sector. Indeed, corruption favors non-productive projects, since it tends to erode the composition of public expenditures by directing them towards the acquisition of equipment. Such a move tends to reduce the productivity of public investments, especially by lowering the quality of infrastructure

and public services and increasing the cost of goods and services. This can lead to deterioration in the quality of all services and production outlets under State control. In a corrupt regime, individuals seek rents rather than productive activities by modifying the organization of public expenditure.

For public spending on education, governance quality is relatively important and has an overall positive effect on the outcome of government policies. This effect indicates that when governance quality is weighted on government effectiveness, an increase in government effectiveness (as measured by the variable governance) leads to an improvement in secondary school enrollment rate. Similarly, when governance quality is weighted against corruption, an improvement in the latter leads, all other things being equal, to an improvement in secondary school enrollment rate.

For the net effect of governance variables on public health, we found that better governance practices, reflected in low corruption and an efficiency of public measures, lead considerably to successful public programs. Similarly, governance reflected in better quality of public and private services, politically-independent decisions, good quality policy formulation and implementation, and credibility of governments for such policies, reduces the additional costs of rent-seeking and leads to better social welfare outcomes. However, this finding can also be explained by the fact that additional public spending in these areas can generate rent-seeking behavior, in favor of programs that are less efficient in terms of economic feasibility and technical development.

In sum, we have highlighted the importance of good governance practices on the efficiency of government spending, particularly the effect of corruption. Indeed, corruption is present everywhere in public services and the population's access to essential services remains very limited and sometimes depends on bribe payments. This conclusion is confirmed mainly for public contracts, leading either to embezzlement of funds or to changes in the amounts of expenditure allocated to the education and health sectors.

Despite the inconclusive nature of the empirical literature on the subject, a consensus seems to be that shifting the structure of public spending towards health, education, and basic infrastructure tends to have a positive impact on growth. However, it is important to emphasize that governance quality and the institutional environment represent conceits conducive to effective public spending and outcomes.

References

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277-297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*(1), 29-51.

Aschauer, D. A. (1989). Public investment and productivity growth in the group of seven. *Economic Perspectives, 13*(5), 17-25.

Barro, R. J. (1990). Government spending in a simple model of endogeneous growth. *Journal of Political Economy, 98*(5), S103-125.

Beunen, R., Duineveld, M., & van Assche, K. A. M. (2016). Evolutionary governance theory and the adaptive capacity of the Dutch planning system. In *Spatial planning in a complex unpredictable world of change* (pp. 98-116). London: InPlanning.

Bezes, P., Chiapello, E., & Desmarez, P. (2016). Introduction: La tension savoirs-pouvoirs à l'épreuve du gouvernement par les indicateurs de performance. *Sociologie du Travail, 58*(4), 347-369.

Birkland, T. A. (2015). *An introduction to the policy process: Theories, concepts and models of public policy making.* London: Routledge.

Collier, P., & Hoeffler, A. (2005). Resource rents, governance, and conflict. *Journal of Conflict Resolution, 49*(4), 625-633.

Devarajan, S., Swaroop, V., & Zou, H. F. (1996). The composition of public expenditure and economic growth. *Journal of Monetary Economics, 37*(2), 313-344.

Easterly, W., & Rebelo, S. (1993). Fiscal policy and economic growth. *Journal of Monetary Economics, 32*(3), 417-458.

Filmer, D., & Pritchett, L. (1999). The impact of public spending on health: Does money matter? *Social Science & Medicine, 49*(10), 1309-1323.

Filmer, D., Hammer, J. S., & Pritchett, L. H. (2000). Weak links in the chain: A diagnosis of health policy in poor countries. *The World Bank Research Observer, 15*(2), 199-224.

Ghura, D., & Hadjimichael, M. T. (1996). Growth in Sub-Saharan Africa. *Staff Papers, 43*(3), 605-634.

Guetat, I. (2006). The effects of corruption on growth performance of the MENA countries. *Journal of Economics and Finance, 30*(2), 208-221.

Gupta, M. S., & Abed, M. G. T. (2002). *Governance, corruption, and economic performance.* Washington, DC: International Monetary Fund.

Gupta, S., Verhoeven, M., & Tiongson, E. (2001). *Public spending on health care and poor*. Washington, D.C.: International Monetary Fund.

Jusot, F. (2006). The shape of the relationship between mortality and income in France. *Annales d'Economie et de Statistique, 83/84*, 89-122.

Khan, M. S., & Kumar, M. S. (1997). Public and private investment and the growth process in developing countries. *Oxford Bulletin of Economics and Statistics, 59*(1), 69-88.

Marmot, M., & Wilkinson, R. G. (2001). Psychosocial and material pathways in the relation between income and health: A response to Lynch et al. *BMJ, 322*(7296), 1233-1236.

Mauro, P., & Driscoll, D. D. (1997). *Why worry about corruption?* (Vol. 6, pp. 1-19). Washington, DC: International Monetary Fund.

Mills, P., & Quinet, A. (1992). Dépenses publiques et croissance. *Revue française d'économie Année, 7*(3), 29-60.

Morley, B., & Perdikis, N. (2000). Trade liberalisation, government expenditure and economic growth in Egypt. *The Journal of Development Studies, 36*(4), 38-54.

Ojo, O., & Oshikoya, T. (1995). Determinants of long-term growth: Some African results. *Journal of African Economies, 4*(2), 163-191.

Pinson, G. (2015). Gouvernance et sociologie de l'action organisée. Action publique, coordination et théorie de l'État. *L'Année sociologique, 65*(2), 483-516.

Preston, S. H. (1975). The changing relation between mortality and level of economic development. *Population Studies, 29*(2), 231-248.

Pritchett, L. (1996). Mind your p's and q's: The cost of public investment is not the value of public capital. Retrieved from https://doi.org/10.1596/1813-9450-1660

Rajhi, T. (1996). *Dynamique Des Politiques de Croissance.* Paris: Economica.

Rodrik, D. (1998). Why do more open economies have bigger governments? *Journal of Political Economy, 106*(5), 997-1032.

Semkat, D., Kremp, D., & Bonitz, M. (1999). Kadanoff-Baym equations with initial correlations. *Physical Review E, 59*(2), 1557.

Stenberg, K., Axelson, H., Sheehan, P., Anderson, I., Gülmezoglu, A. M., Temmerman, M., … Sweeny, K. (2014). Advancing social and economic development by investing in women's and children's health: A new global investment framework. *The Lancet, 383*(9925), 1333-1354.

Suliman, A. H., & Elian, M. I. (2014). Foreign direct investment, financial development, and economic growth: A cointegration model. *The Journal of Developing Areas, 48*(3), 219-243.

Tanzi, V., & Davoodi, H. (1997). *Corruption, public investment.* Washington, D.C.: International Monetary Fund.

Westphal, J. D., & Zajac, E. J. (2013). A behavioral theory of corporate governance: Explicating the mechanisms of socially situated and socially constituted agency. *Academy of Management Annals, 7*(1), 607-661.

Williamson, B. (2015). Governing software: Networks, databases and algorithmic power in the digital governance of public education. *Learning, Media and Technology, 40*(1), 83-105.

World Health Organization. (2002). The world health report 2002: Reducing risks, promoting healthy life.